User's Manual

AQ1100 OLTS
Multi Field Tester
Communication Interface

YOKOGAWA ◆
Yokogawa Electric Corporation

Thank you for purchasing the AQ1100 OLTS Multi Field Tester. This Communication Interface User's Manual describes the functions and commands of the following communication interfaces.
• USB Interface
• Ethernet Interface (Optional)
To ensure correct use, please read this manual thoroughly before beginning operation.
After reading the manual, keep it in a convenient location for quick reference whenever a question arises during operation.
The following manuals are provided for the AQ1100. Please read all of them.

Manual Name	Manual No.	Description
AQ1100 OLTS Multi Field Tester User's Manual (CD-ROM)	IM AQ1100-01EN	Explains all functions except for the communications functions and operation procedures of the instrument.
AQ1100 OLTS Multi Field Tester Communication Interface User's Manual (CD-ROM)	IM AQ1100-17EN	Describes the communications functions of the USB/Ethernet interfaces. This manual.
AQ1100 OLTS Multi Field Tester Operation Guide	IM AQ1100-02EN	Describes safety precautions and the basic operations.

Notes

- The contents of this manual are subject to change without prior notice as a result of improvements in instrument's performance and functions.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact your nearest YOKOGAWA representative.
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Revisions

November 2009:   1st Edition

How to Use this Manual

Structure of the Manual

This User's Manual consists of the following sections:

Chapter 1   USB Interface

Describes the functions and specifications of the USB interface used to control the AQ1100 OLTS Multi Field Tester from a PC.

Chapter 2   Ethernet Interface (Option)

Describes the functions and specifications of the Ethernet interface.

Chapter 3   Before Programming

Describes the syntax used to transmit commands.

Chapter 4   Commands

Describes each command that is available.

Chapter 5   Condition Register / Output Queue and Error Queue

Describes the register and queues.

Appendix

Explains the support for AQ1100 error cord.

Conventions Used in This Manual

Notations Used in the Procedural Explanations

On pages that describe the operating procedures in each chapter, the following notations are used to distinguish the procedure from their explanations.

Procedure This subsection contains the operating procedure used to carry out the function described in the current section. The procedures are written with inexperienced users in mind; experienced users may not need to carry out all the steps.

Explanation This subsection describes the setup parameters and the limitations on the procedures.

Note Calls attention to information that is important for proper operation of the instrument.

Terms Used in Explanations of Procedures

Panel Keys and Soft Keys

Bold characters used in the procedural explanations indicate characters that are marked on the panel keys or the characters of the soft keys displayed on the screen menu.

Units

k: Denotes "1000." Example: 400km

K: Denotes "1024." Example: 459 KB (file data size)

Symbols Used in Syntax Descriptions

Symbols which are used in the syntax descriptions in Chapter 5 are shown below.

These symbols are referred to as BNF notation (Backus-Naur Form).

For detailed information, see section 3.4, "Data."

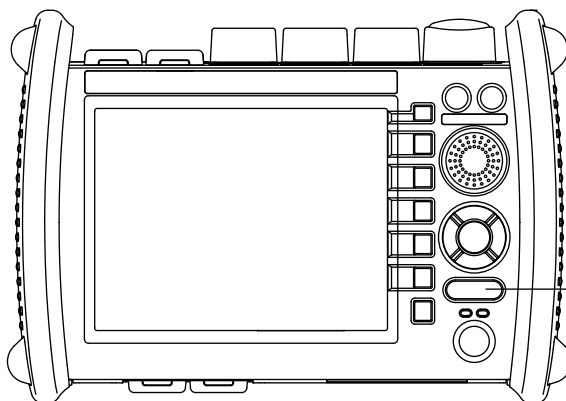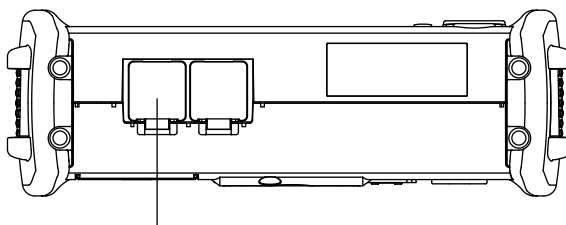| Symbol	Description	Example	Example of Input
<>	Defined value	SET:M<x> <x> = 1,2,3	-> SET:M2
{}	One of the options in {} is selected.	LMTechnique {LSA|TPA}	-> LMTechnique TPA
|	Exclusive OR		

Contents

1.1   Names and Functions of Parts

Front Panel

SETUP key
Press this key to select
the USB interface.

Bottom

USB type B (mini B) connector
Connector used to connect the AQ1100 to the
controller (such as a PC) using a USB cable.

1.2 USB Interface Functions and Specifications

USB Interface Functions and Specifications

Reception Function

You can specify the same settings as those specified by front panel key operations.

Receives output requests for measured data, setup data of the panel, and error codes.

Transmission Function

Outputs measured and computed data.

Outputs panel setup data and the status byte.

Outputs error codes that have occurred.

USB Interface Specifications

Electrical and mechanical specifications: Conforms to USB Rev.1.1

Connector: Type B (mini B) connector (receptacle)

Number of ports: 1

Power supply: Self-powered

Compatible PC systems: PC running Windows 2000, Windows XP, or Windows Vista with a standard USB port (a separate device driver is needed to connect to a PC).

Switching between Remote and Local Modes

When Switching from Local to Remote Mode

Sending a command when the instrument is in the local mode causes the instrument to switch to the remote mode.

• All keys except the **Local** soft key are disabled.
• Settings entered in local mode are retained even when the AQ1100 switches to remote mode.

When Switching from Remote to Local Mode

Pressing the **Local** soft key in remote mode puts the instrument in local mode.

• Key operations are enabled.
• Settings entered in remote mode are retained even when the AQ1100 switches to local mode.

Note

The AQ1100 cannot be remotely controlled via the USB interface while the storage function is in operation. Remote control via the Ethernet interface is also not possible.

1.3 Connecting via the USB Interface

Connection Procedure

1. Open the bottom cover of the left side.

2. Connect a USB cable to the type B (mini B) connector.

Bottom
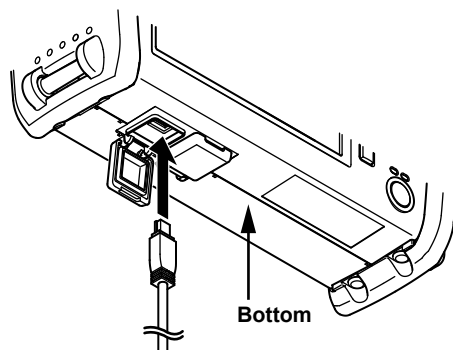
Precautions to Be Taken When Connecting the Cable

• Connect the USB cable by inserting the connector firmly into the USB connector.

• Do not connect or disconnect the USB cable after the power is turned ON until the AQ1100 series is ready for operation (approximately 20 s).

1.4 Setting the AQ1100 (USB)

Selecting the USB Interface Function

1. Press **SETUP** and then the **System Setup** soft key to display the following screen.

```
                Common
Language          English
Beep            Off    On
Start Menu        Top Menu
USB Function       Storage          —— Set the mode to Control I/O.
Screen Color        Color
◄        Date & Time Set
◄         Power Save
◄        Network Setup
◄          Default
```

Releasing the Remote Control

1. Press the **Local** soft key that appears on the screen after communication starts.

```
Control I/O

  Local
```
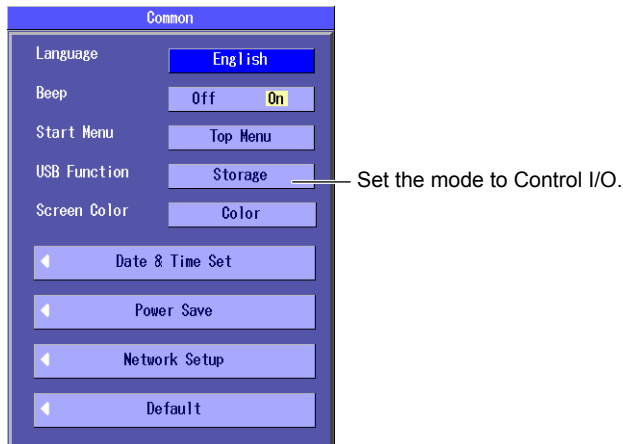
USB Interface

To control the AQ1100 remotely using communication commands through the USB port, install YOKOGAWA's TMC (Text and Measurement Class) driver into your PC. To obtain YOKOGAWA's USB TMC driver, contact your nearest YOKOGAWA dealer or access the following USB driver page at our Web site and download it.

http://www.yokogawa.com/tm/tm-softdownload.htm

Note
- You cannot change the display while the AQ1100 is being remotely controlled.
- Only use the USB TMC driver (or software) provided by YOKOGAWA.

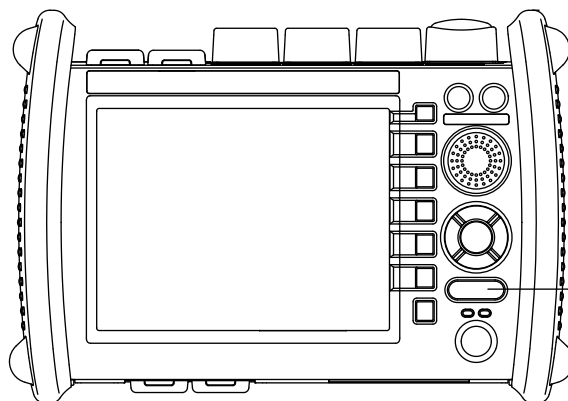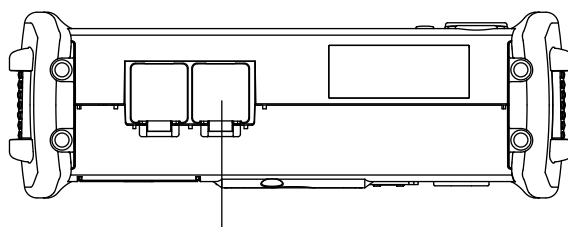# 2.1   Names and Functions of Parts

Front Panel

SETUP key
Press this key to select
the ethernet interface.

Bottom

Ethernet Port
Connector used to connect the AQ1100 to the
controller (such as a PC) using a ethernet cable.

2.2 Ethernet Interface Functions and Specifications

Ethernet Interface Features

Reception Feature

The AQ1100 reception feature allows you to specify the same settings through an Ethernet connection that you can specify using the front panel keys.

The AQ1100 can receive output requests for measured data, panel setting data, and error codes.

Transmission Feature

The AQ1100 can transmit measured data.

The AQ1100 can transmit panel setting data and the status byte.

The AQ1100 can transmit error codes when errors occur.

Ethernet Interface Specifications

Electrical and mechanical specifications: Conforms to IEEE802.3

Transmission system: Ethernet (10BASE-T/100BASE-TX)

Data rate: 10 Mbps/100 Mbps

Number of communication ports: 1

Port number: 10001/tcp

Communication protocol: VXI-11

Connector type: RJ45 connector

Switching between Remote and Local Modes

When Switching from Local to Remote Mode

Sending a command when the instrument is in the local mode causes the instrument to switch to the remote mode.

- All keys except the **Local** soft key are disabled.
- Settings entered in local mode are retained even when the AQ1100 switches to remote mode.

When Switching from Remote to Local Mode

Pressing the **Local** soft key in remote mode puts the instrument in local mode.

- Key operations are enabled.
- Settings entered in remote mode are retained even when the AQ1100 to local mode.

> *Note*
> The AQ1100 cannot be remotely controlled via the USB interface while the storage function is in operation. Remote control via the Ethernet interface is also not possible.

FTP Function

The AQ1100 series has an FTP function. You can transfer the data stored in the AQ1100 internal memory to the PC using FTP commands from the PC.

2.3   Connecting the Ethernet Interface

Connection Procedure

1. Open the bottom cover of the right side.
2. Connect a UTP (Unshielded Twisted-Pair) cable or an STP (Shielded Twisted-Pair) cable that is connected to a hub, for example, to the 100BASE-TX port on the bottom of the AQ1100.

Ethernet

Hub or router supporting 100BASE-TX

Bottom

AQ1100

PC

Network NIC
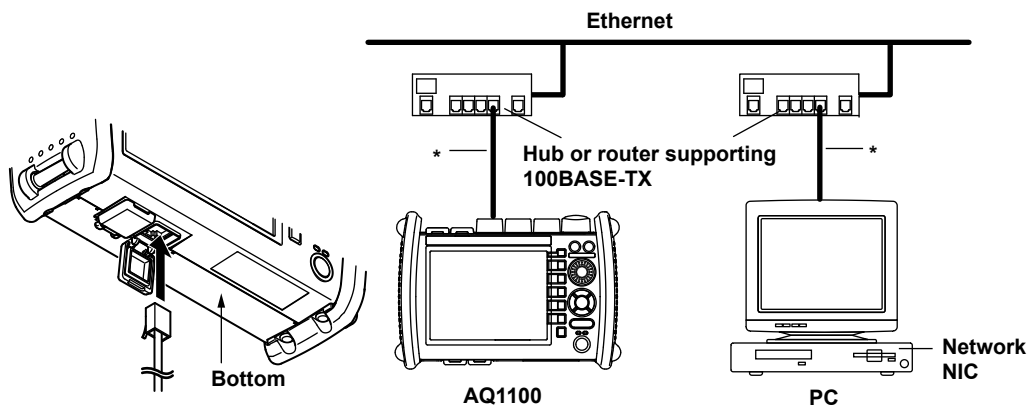
*   UTP cable or STP cable (straight cable in either case)

Precautions to Be Taken When Connecting the Cable

• Be sure to use a straight cable via a hub for the connection between the AQ1100 and the PC.
• Use a network cable that conforms to your network environment (such as the data rate).
• When using a UTP cable (straight cable), use a cable of category 5.

2.4 Setting the AQ1100 (Network)

The settings for remotely controlling the AQ1100 via the Ethernet interface are explained below.

Procedure

Selecting the Ethernet Interface Function

1. Press **SETUP** and then the **System Setup** soft key to display the following screen.

Set the Ethernet Interface.
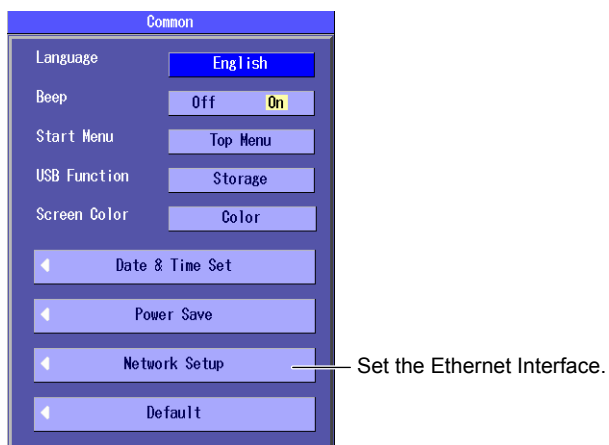
Releasing the Remote Control

1. Press the **Local** soft key that appears on the screen after communication starts.

Explanation

Setting the Ethernet Interface

You must set the following parameters to use the Ethernet interface function.

- **Enabling or Disabling the Network Setup**

  After you have set the user name, password, timeout value, and TCP/IP parameters, select Valid and then restart the AQ1100 to use the network connection.

- **User Name**

- **Password**

- **Setting the Timeout Value**

  The connection to the network is automatically disconnected if there is no access to the AQ1100 for the specified time.

- **Setting the TCP/IP**

  IP Address

  Subnet Mask

  Default Gateway

For details on how to configure the settings, see section 10.4, "Configuring Network Settings (Option)," in the *AQ1100 Multi Field Tester OLTS User's Manual*, IM AQ1100-01EN.

Note

- You must restart the AQ1100 if you change the Ethernet settings. Before you restart the AQ1100, the settings from before you changed the settings are used.
- The AQ1100 cannot be remotely controlled via the ethernet interface while the USB storage function is in operation.

3.1   Messages

Messages

Messages are used to exchange information between the controller and the instrument. Messages that are sent from the controller to the instrument are called program messages and messages that are sent back from the instrument to the controller are called response messages.

If a program message contains a message unit that requests a response (a query), the instrument returns a response message upon receiving the program message. A single response message is always returned in response to a single program message.

Program Messages
Program Message Unit

A program message consists of zero or more program message units; each unit corresponds to one command. The instrument executes the received commands in order.

Each program message unit is separated by a semicolon (;).

Example `:PMETer:MODulation MOD_CW;UNIT DB<PMT>`

Unit   Unit

<PMT>

PMT is a program message terminator. The following three types are available.

*   **NL (New Line)**
    Same as LF (Line Feed). ASCII code"0AH" is used.
*   **^END**
    END message defined in IEEE488.1. (EOI signal) (The data byte sent with an END message will be the final item of the program message unit.)
*   **NL^END**
    NL with an END message added (NL is not included in the program message unit.)

Program Header

A program header is used to indicate the command type. For details, see section 3.2, "Commands."

Program Data

If certain conditions are required in executing a command, program data is added. A space (ASCII code "20H") separates the program data from the header. If there are multiple sets of program data, they are separated by commas (,). For details, see section 3.4, "Data."

Example `:PMETer:MODulation MOD_CW<PMT>`

Header   Data

Response Messages
Response Message Units

A response message consists of one or more response message units: each response message unit corresponds to one response. Response message units are delimited by a ";" (semicolon).

Example `:PMETer:MODulation MOD_CW;UNIT DB<PMT>`

Unit   Unit

<RMT>

RMT stands for "response message terminator." The response message terminator is NL^EOM.

Response Header

A response header sometimes precedes the response data. A space separates the data from the header. For details, see section 3.3, "Response."

Response Data

Response data contains the content of the response. If there are multiple sets of response data, they are separated by commas (,). For details, see section 3.4, "Data."

Example `850E-9<RMT> :PMETer:MODulation MOD_CW<PMT>`

Data   Header   Data

If there are multiple queries in a program message, responses are returned in the same order that the queries were received in. The AQ1100 returns a single response message unit to most queries, but there are queries that the AQ1100 returns multiple units to. The first response message unit always corresponds to the first query, but the nth response unit may not necessarily correspond to the nth query. If you want to make sure that every response is retrieved, divide the program messages into individual messages.

Note

- It is always possible to send a program message if the previous message which was sent did not contain any queries.
- If the previous message contained a query, it is not possible to send another program message until a response message has been received. An error will occur if a program message is sent before a response message has been received in its entirety. A response message which has not been receivedwill be discarded.
- If an attempt is made by the controller to receive a response message, even if there it no response message, an error will occur. An error will also occur if the controller makes an attempt to receive a response message before transmission of a program message has been completed.
- If a program message of more than one unit is sent and some of the units are incomplete, this instrument receives program message units which the instrument thinks complete and attempts to execute them. However, these attempts may not always be successful and a response may not always be returned, even if the program message contains queries.

3.2 Commands

Command
There are three types of commands (program headers) that a controller may send to the DLM2000. The commands differ in their program header formats.

Common Command Header
Commands that are defined in IEEE 488.2-1987 are called common commands. Be sure to include an asterisk (*) at the beginning of a common command.

Common command example `*CLS`

Compound Header
Other commands that are specific to the AQ1100 are classified and arranged in a hierarchy according to their functions. Be sure to use a colon to specify a lower hierarchical level.

Compound header example `:PMETer:LINK:STATe`

When Concatenating Commands
Command Groups
A command group is a group of commands that have common compound headers arranged in a hierarchy. A command group may contain sub-groups.

Example
Commands relating to acquisition settings
```
:PMETer:DREF
:PMETer:LINK:STATe
:PMETer:MAXMin:STATe
:PMETer:MODulation
:PMETer:OFFSet
:PMETer:REFerence
:PMETer:WAVelength:DETail
```

When Concatenating Commands of the Same Group
The AQ1100 stores the hierarchical level of the command that is currently being executed and processes the next command on the assumption that it belongs to the same level. Therefore, the common header section can be omitted for commands that belong to the same group.

Example
```
:PMETer:MODulation MOD_CW;UNIT DB<PMT>
```

When Concatenating Commands of Different Groups
If the subsequent command does not belong to the same group, place a colon in front of the header (cannot be omitted).

Example
```
:PMETer:MODulation MOD_CW;:MENU:
FUNCtion TOP<PMT>
```

When Concatenating Common Commands
Common commands that are defined in the IEEE 488.2-1987 are independent of hierarchy. There is no need to use a colon.

Example
```
:PMETer:MODulation MOD_CW;*CLS;UNIT
DB<PMT>
```

When Separating Commands with <PMT>
If a terminator is used to separate two commands, each command is a separate message. Therefore, the common header must be typed in for each command even when commands of the same command group are being concatenated.

Example
```
:PMETer:MODulation MOD_CW<PMT>:PMETer
UNIT DB<PMT>
```

Upper-level Query
An upper-level query is a query that is made by appending a question mark to the highest level command of a group. The controller can receive all of the settings in a group collectively by executing an upper-level query. Some upper-level queries of a group, which may be comprised of more than three hierarchical levels, can cause the AQ1100 to transmit all the lower level settings.

Example
```
:NETWork:CONTrol?<PMT> -> :NETW:CONT:
PASS "ABC";TIM 30;USER "anonyumous"
```

Note
- The response to an upper-level query can be sent back to the AQ1100 as a program message. This enables the settings that were present when the upper-level query was made to be reproduced later on.
- Some upper-level queries do not return setup data that is not currently in use. Exercise caution because not all of a group's information is necessarily returned in a response.

Header Interpretation Rules

The AQ1100 interprets the header that it receives according to the rules below.

> **Example**
>
> "DRANge" can be written as "drange" or "Drange."

- The lower-case characters can be omitted.

> **Example**
>
> "DRANge" can be written as "DRANG" or "DRAN."

- The question mark at the end of a header indicates that it is a query. You cannot omit the question mark.

> **Example**
>
> The shortest abbreviation for "DRANge?" is "DRAN?."

- If the <x> (value) at the end of a mnemonic is omitted, it is interpreted as a 1.

> **Example**
>
> If you write "M" for "M<x>, " "M1." is specified.

Note

A mnemonic is a character string made up of alphanumeric characters.)

3.3 Response

Form

When the controller sends a query with a question mark, the AQ1100 returns a response message to the query.

Response Consisting of a Header and Data

Responses that can be used as program messages without any changes are returned with command headers attached.

> **Example**
> :PMETer:MODulation?<PMT>
> -> :PMETer:MODulation MOD_270HZ<RMT>

If You Want the AQ1100 to Return Responses without Headers

You can configure the AQ1100 so that even responses that have both headers and data are returned without headers. Use the COMMunicate:HEADer command for this purpose.

Abbreviated Form

The AQ1100 normally returns response headers with the lower-case section removed. You can configure the AQ1100 so that full headers are returned. Use the COMMunicate:VERBose command for this purpose.

3.4   Data

Data contains conditions and values that are written after the header. A space separates the data from the header. Data is grouped as follows:

Data	Description
<Decimal>	A value expressed in decimal notation (Example: Western calendar year ->MISC:DATE:YEAR 2009)
<Distance><Time> <Wavelength><Loss>	A physical value (Example: Timeout value ->NETWork: CONTrol:TIMeout 30))
<Character data>	Predefined character string (mnemonic). Select from the available strings in braces. (Example: Select the function mode ->MENU:FUNCtion {TOP|LSPM|LOSStest |PONPm|MLOSstest|IPTest})
<Boolean>	Indicates ON and OFF. Specify ON or OFF. (Example: Turn on the DHCP ->NETWork: DHCP ON))
<String data>	User-defined string (Example: Set the Network password ->NETWork:CONTrol:PASSword "ABC")

<Decimal>

<Decimal> indicates a value expressed as a decimal number, as shown in the table below. Decimal values are written in the NR form as specified in ANSI X3.42-1975.

Symbol	Description	Example		
<NR1>	Integer	125	−1	+1000
<NR2>	Fixed point number	125.0	−.90	+001.
<NR3>	Floating point number	125.0E+0	−9E−1	+.1E4
<NRf>	Any of the forms <NR1> to <NR3> is allowed.			

- The AQ1100 can receive decimal values that are sent from the controller in any form, from <NR1> to <NR3>. This is expressed as <NRf>.
- The AQ1100 returns a response to the controller in one of the forms from <NR1> to <NR3> depending on the query. The same form is used regardless of the size of the value.
- For the <NR3> form, the plus sign after the "E" can be omitted. You cannot omit the minus sign.
- If a value outside the setting range is entered, the value is adjusted to the closest value within the range.
- If a value has more significant digits than are available, the value will be rounded.

<Distance>, <Time>, <Wavelength>, and <Loss>

<Distance>, <Time>, <Wavelength>, and <Loss> indicate decimal values that have physical significance. A <Multiplier> or <Unit> can be attached to the <NRf> form that was described earlier. The following types of expressions are possible.

Form	Example
<NRf><Multiplier><Unit>	0.85UM
<NRf><Unit>	500m
<NRf><Multiplier>	5M
<NRf>	5E -3

<Multiplier>

<Multipliers> that you can use are indicated in the following table.

Symbol	Word	Description
EX	Exa	10^{18}
PE	Peta	10^{15}
T	Tera	10^{12}
G	Giga	10^{9}
MA	Mega	10^{6}
K	Kilo	10^{3}
M	Milli	10^{-3}
U	Micro	10^{-6}
N	Nano	10^{-9}
P	Pico	10^{-12}
F	Femto	10^{-15}
A	Atto	10^{-18}

<Unit>

<Units> that you can use are indicated in the following table.

Symbol	Word	Description
M	Meter	Distance
S	Second	Time
dB	Decibel	Level
UM	Micro meter	Wavelength

- <Multiplier> and <Unit> are not case sensitive.
- "U" is used to indicate micro ("μ").
- "MA" is used for Mega to distinguish it from Milli.
- If both <Multiplier> and <Unit> are omitted, the default unit is used.

<Character Data>

<Character data> is a predefined character string (mnemonics). It is mainly used to indicate that an option listed as a character string in braces must be selected and entered. The data interpretation rules are the same as those described in "Header Interpretation Rules" on page 3-4.

Form	Example
{SIMPLE|DETAIL|WIZARD|MULTI}	DETAIL

• As with the header, the `COMMunicate:VERBose` command can be used to select whether to return the response in the full form or in the abbreviated form.

• The `COMMunicate:HEADer` setting does not affect <character data>.

<Boolean>

<Boolean> is data that indicates ON or OFF. The following types of expressions are possible.

Form	Example			
{ON|OFF|<NRf>}	ON	OFF	1	0

• When <Boolean> is expressed in the <NRf> form, "OFF" is selected if the rounded integer value is 0, and ON is selected for all other cases.

• A response message is always returned with a 1 if the value is ON and with a 0 if the value is OFF.

<String Data>

<String data> is not a predefined character string like <character data>. It can be any character string. The character string must be enclosed in single quotation marks (') or double quotation marks (").

Form	Example
<Character string data>	'ABC' "IEEE488.2-1987"

• If a character string contains a double quotation mark ("), the double quotation mark is expressed as two consecutive quotation marks (""). This rule also applies to single quotation marks.

• A response message is always enclosed in double quotation marks (").

• <String data> is any character string. Therefore, the AQ1100 assumes that the remaining program message units are part of the character string if no single (') or double quotation mark (") is encountered. As a result, no error is detected if a quotation mark is omitted.

3

Before Programming

4.1 List of Commands

Command	Function	Page
COMMunicate Group		
:COMMunicate?	Queries all communication settings.	4-4
:COMMunicate:HEADer	Sets or queries whether or not a header is added to the response to a query. (Example with header: PMETer:REFerence 5.00. Example without header: 5.00.)	4-4
:COMMunicate:VERBose	Sets or queries whether the response to a query is returned fully spelled out (example: PMETer:REFerence 5.00) or using abbreviation (example: PMET: REF 5.00).	4-4
LIGHtsource Group		
:LIGHtsource:ABORt	Turns the measurement light off.	4-5
:LIGHtsource:EXECute	Turns the measurement light on.	4-5
:LIGHtsource:MODulation	Sets or queries the light source modulation frequency.	4-5
:LIGHtsource:WAVelength	Sets or queries the light source wavelength.	4-5
MENU Group		
:MENU:ERRor:CLEar	Clears the error dialog box.	4-6
:MENU:FUNCtion	Sets or queries the function mode.	4-6
MISC Group		
:MISC:ALARmsound	Sets or queries the alarm sound.	4-7
:MISC:BRIGhtness:AC	Sets or queries the LCD brightness when the AC adapter is connected.	4-7
:MISC:BRIGhtness:BATTery	Sets or queries the LCD brightness when the AQ1100 is running on battery power.	4-7
:MISC:BACKlightoff	Sets or queries the backlight off setting when the AQ1100 is running on battery power.	4-7
:MISC:DATE:DAY	Sets or queries the day.	4-7
:MISC:DATE:GET?	Queries the date and time.	4-7
:MISC:DATE:HOUR	Sets or queries the hour.	4-7
:MISC:DATE:MINute	Sets or queries the minute.	4-7
:MISC:DATE:MODE	Sets or queries the date display type.	4-7
:MISC:DATE:MONTh	Sets or queries the month.	4-7
:MISC:DATE:SECond	Sets or queries the second.	4-8
:MISC:DATE:SET	Applies the date and time change.	4-8
:MISC:DATE:YEAR	Sets or queries the year.	4-8
:MISC:LANGuage	Sets or queries the language.	4-8
:MISC:POWersave:AC	Sets or queries the power-save setting when the AC adapter is connected.	4-8
:MISC:POWersave:BATTery	Sets or queries the power-save setting when the AQ1100 is running on battery power.	4-8
NETWork Group		
:NETWork:CONTrol:PASSword	Sets or queries the password.	4-9
:NETWork:CONTrol:TIMeout	Sets or queries the timeout value.	4-9
:NETWork:CONTrol:USERname	Sets or queries the user name.	4-9
:NETWork:DHCP	Sets or queries the DHCP on/off state.	4-9
:NETWork:GATeway	Sets or queries the gateway.	4-9
:NETWork:IPADdress	Sets or queries the IP address.	4-9
:NETWork:NETMask	Sets or queries the subnet mask.	4-10
:NETWork:STATe	Sets or queries the Ethernet on/off state.	4-10

4

Commands

Command	Function	Page
PMETer Group		
:PMETer:AVERage:TIMes	Sets or queries the power meter average count.	4-11
:PMETer:DREF	Executes Dref on the power meter.	4-11
:PMETer:LINK:STATe	Sets or queries the light source power meter setting interlock.	4-11
:PMETer:MAXMin:STATe	Sets or queries the MAX and MIN display on/off state.	4-11
:PMETer:MAXMin:MAX?	Sets or queries the maximum value.	4-11
:PMETer:MAXMin:MIN?	Sets or queries the minimum value.	4-11
:PMETer:MEASurement:DATA?	Queries the power meter's measured results.	4-11
:PMETer:MODulation	Sets or queries the power meter modulation.	4-11
:PMETer:OFFSet	Sets or queries the power meter offset.	4-11
:PMETer:REFerence	Sets or queries the power meter reference value.	4-11
:PMETer:THReshold:LOWer	Sets or queries the power meter lower threshold value.	4-11
:PMETer:THReshold:UPPer	Sets or queries the power meter upper threshold value.	4-12
:PMETer:UNIT	Sets or queries the power meter display unit.	4-12
:PMETer:WAVelength:DETail	Sets or queries the wavelength when the wavelength mode is set to Detail.	4-12
:PMETer:ZERoset	Executes zero set on the power meter.	4-12
PON Group		
:PON:AVERage:TIMes	Sets or queries the PON power meter average count.	4-13
:PON:DIRection	Sets or queries the PON power meter wavelength.	4-13
:PON:M1310:MEASurement:DATA?	Queries the measured results of the 1310 nm PON power meter.	4-13
:PON:M1310:OFFSet	Sets or queries the 1310 nm PON power meter offset.	4-13
:PON:M1310:THReshold:JUDGe?	Queries the threshold judgment results of the 1310 nm PON power meter.	4-13
:PON:M1310:THReshold:LOWer	Sets or queries the lower threshold value of the 1310 nm PON power meter.	4-13
:PON:M1310:THReshold:UPPer	Sets or queries the upper threshold value of the 1310 nm PON power meter.	4-13
:PON:M1490:MEASurement:DATA?	Queries the measured results of the 1490 nm PON power meter.	4-13
:PON:M1490:OFFSet	Sets or queries the 1490 nm PON power meter offset.	4-13
:PON:M1490:THReshold:JUDGe?	Queries the threshold judgment results of the 1490 nm PON power meter.	4-13
:PON:M1490:THReshold:LOWer	Sets or queries the lower threshold value of the 1490 nm PON power meter.	4-13
:PON:M1490:THReshold:UPPer	Sets or queries the upper threshold value of the 1490 nm PON power meter.	4-14
:PON:M1550:MEASurement:DATA?	Queries the measured results of the 1550 nm PON power meter.	4-14
:PON:M1550:OFFSet	Sets or queries the 1550 nm PON power meter offset.	4-14
:PON:M1550:THReshold:JUDGe?	Queries the threshold judgment results of the 1550 nm PON power meter.	4-14
:PON:M1550:THReshold:LOWer	Sets or queries the lower threshold value of the 1550 nm PON power meter.	4-14
:PON:M1550:THReshold:UPPer	Sets or queries the upper threshold value of the 1550 nm PON power meter.	4-14
:PON:UNIT	Sets or queries the PON power meter display unit.	4-14
:PON:ZERoset	Executes zero set on the PON power meter.	4-14
PRINt Group		
:PRINt:COLor	Sets or queries the print colors.	4-15
:PRINt:EXECute	Executes printing.	4-15
:PRINt:MAKer	Sets or queries the printer manufacturer.	4-15
SETup Group		
:SETup:INITialize	Returns all settings to their factory defaults.	4-16
STATus Group		
:STATus?	Queries all the settings for the communication status feature.	4-17
:STATus:CONDition?	Queries the contents of the condition register.	4-17
:STATus:ERRor?	Queries the error code and message information (top of the error queue).	4-17
:STATus:QENable	Sets or queries whether or not messages other than errors will be stored to the error queue (on/off).	4-17
:STATus:QMESsage	Sets or queries whether or not message information will be attached to the response to the STATus:ERRor? query (on/off).	4-17
SYSTem Group		
:SYSTem:REBoot	Restarts the AQ1100.	4-18
:SYSTem:SHUTdown	Shuts down the AQ1100.	4-18

Command	Function	Page

VLS Group

Command	Function	Page
`:VLS:ABORt`	Turns the visible light source off.	4-19
`:VLS:EXECute`	Turns the visible light source on.	4-19

Common Commands

Command	Function	Page
`*CLS (Clear Status)`	Clears all event status registers that are displayed in the status byte register summary.	4-20
`*ESE (Standard Event Status Enable)`	Sets or queries the standard event enable register.	4-20
`*ESR? (Standard Event Status Register)`	Queries and clears the standard event status register.	4-20
`*IDN? (Identification)`	Queries the instrument type and firmware version.	4-20
`*OPT? (Option)`	Queries the option information.	4-20
`*RST (Reset)`	Returns all the settings except the communication settings to their factory default values.	4-20
`*SRE (Service Request Enable)`	Sets or queries the service request enable register.	4-21
`*STB? (Read Status Byte)`	Queries the current status byte register value.	4-21
`*TST? (Self Test)`	Executes a self-test.	4-21

4

Commands

4.2 COMMunicate Group

The commands in this group deal with communications. There are no front panel keys that correspond to the commands in this group.

`:COMMunicate?`

Function	Queries all communication settings.
Syntax	`:COMMunicate?`
Example	`:COMMUNICATE? -> :COMMUNICATE:HEADER 1;VERBOSE 0`

`:COMMunicate:HEADer`

Function	Sets or queries whether or not a header is added to the response to a query. (Example with header: PMETer:REFerence 5.00. Example without header: 5.00.)
Syntax	`:COMMunicate:HEADer {<Boolean>}` `:COMMunicate:HEADer?`
Example	`:COMMUNICATE:HEADER ON` `:COMMUNICATE:HEADER? ->:COMMUNICATE:HEADER 1`

`:COMMunicate:VERBose`

Function	Sets or queries whether the response to a query is returned fully spelled out (example: PMETer:REFerence 5.00) or using abbreviation (example: PMET:REF 5.00).
Syntax	`:COMMunicate:VERBose {<Boolean>}` `:COMMunicate:VERBose?`

Example	`:COMMUNICATE:VERBOSE ON`
	`:COMMUNICATE:VERBOSE?`
	`->:COMMUNICATE:VERBOSE 0`

4.3 LIGHtsource Group

The commands in this group deal with the light source. You can perform the same operations and make the same settings and queries that you can by using the front panel.

:LIGHtsource:ABORt

Function	Turns the measurement light off.
Syntax	:LIGHtsource:ABORt
Example	:LIGHTSOURCE:ABORT

:LIGHtsource:EXECute

Function	Turns the measurement light on.
Syntax	:LIGHtsource:EXECute
Example	:LIGHTSOURCE:EXECUTE
Description	Measurement light and visible light cannot be on at the same time.

:LIGHtsource:MODulation

Function	Sets or queries the light source modulation frequency.
Syntax	:LIGHtsource:MODulation {MOD_CW|MOD_270HZ|MOD_1KHZ|MODE_2KHZ}
	:LIGHtsource:MODulation?
Example	:LIGHTSOURCE:MODULATION MOD_CW
	:LIGHTSOURCE:MODULATION?
	-> :LIGHTSOURCE:MODULATION MOD_CW
Description	When :LIGHtsource:WAVelength is set to 0.850 um or 1.300 um, the modulation frequency can only be set to CW or 270 Hz.

:LIGHtsource:WAVelength

Function	Sets or queries the light source wavelength.
Syntax	:LIGHtsource:WAVelength {<NRf>}
	:LIGHtsource:WAVelength?
	<NRf> = 0.850um to 1.650um
	(850E-9 to 1650E-9)
Example	:LIGHTSOURCE:WAVELENGTH 0.85um
	:LIGHTSOURCE:WAVELENGTH 1650E-9
	:LIGHTSOURCE:WAVELENGTH 1.650E-6
	:LIGHTSOURCE:WAVELENGTH?
	-> :LIGHTSOURCE:WAVELENGTH 1550E-09
Description	The wavelengths that can be specified vary depending on the model.

4.4 MENU Group

The commands in this group are used to set the function or marker mode or query the settings.

:MENU:ERRor:CLEar

Function	Clears the error dialog box.
Syntax	:MENU:ERRor:CLEar
Example	:MENU:ERROR:CLEAR

:MENU:FUNCtion

Function	Sets or queries the function mode.
Syntax	:MENU:FUNCtion {TOP|LSPM|LOSStest|PONPm|MLOSstest|IPTest}
	:MENU:FUNCtion?
Example	:MENU:FUNCTION TOP
	:MENU:FUNCTION? -> :MENU:FUNCTION LSPM
Description	Top menu: TOP
	Light source power meter: LSPM
	Auto loss test:[1] LOSStest
	PON power meter:[2] PONPm
	Multi-core loss test:[1] MLOSstest
	IPtest:[3] IPTest

    1 Can only be selected on products whose power meter suffix code is SPM or HPM.

    2 Can only be selected on products whose power meter suffix code is PON.

    3 Can only be selected on products with the LAN option.

4.5   MISC Group

The commands in this group deal with the date, language, and power management. You can make the same settings and queries that you can by using the front panel.

:MISC:ALARmsound
Function   Sets or queries the alarm sound.
Syntax   :MISC:ALARmsound {<Boolean>}
    :MISC:ALARmsound?
Example   :MISC:ALARMSOUND OFF
    :MISC:ALARMSOUND?
    -> :MISC:ALARMSOUND 1

:MISC:BRIGhtness:AC
Function   Sets or queries the LCD brightness when the AC adapter is connected.
Syntax   :MISC:BRIGhtness:AC {BRIGHT|NORMAL |DARK}
    :MISC:BRIGhtness:AC?
Example   :MISC:BRIGHTNESS:AC NORMAL
    :MISC:BRIGHTNESS:AC?
    -> :MISC:BRIGHTNESS:AC NORMAL
Description Bright: BRIGHT
    Normal: NORMAL
    Power save: DARK

:MISC:BRIGhtness:BATTery
Function   Sets or queries the LCD brightness when the AQ1100 is running on battery power.
Syntax   :MISC:BRIGhtness:BATTery {BRIGHT| NORMAL|DARK}
    :MISC:BRIGhtness:BATTery?
Example   :MISC:BRIGHTNESS:BATTERY NORMAL
    :MISC:BRIGHTNESS:BATTERY?
    -> :MISC:BRIGHTNESS:BATTERY NORMAL
Description The parameters are the same as those for :MISC: BRIGhtness:AC.

:MISC:BACKlightoff
Function   Sets or queries the backlight off setting when the AQ1100 is running on battery power.
Syntax   :MISC:BACKlightoff {<Boolean>}
Example   :MISC:BACKLIGHTOFF ON
    :MISC:BACKLIGHTOFF?
    -> :MISC:BACKLIGHTOFF 1

:MISC:DATE:DAY
Function   Sets or queries the day.
Syntax   :MISC:DATE:DAY {<NRf>}
    <NRf> = 1 to 31 (in steps of 1)
    :MISC:DATE:DAY?
Example   :MISC:DATE:DAY 1
    :MISC:DATE:DAY? -> :MISC:DATE:DAY 1
Description This setting takes effect when :MISC:DATE:SET is executed.

:MISC:DATE:GET?
Function   Queries the date and time.
Syntax   :MISC:DATE:GET?
Example   :MISC:DATE:GET?
    -> :MISC:DATE:GET 2009/01/31 23:59:59

:MISC:DATE:HOUR
Function   Sets or queries the hour.
Syntax   :MISC:DATE:HOUR {<NRf>}
    <NRf> = 0 to 23 (in steps of 1)
    :MISC:DATE:HOUR?
Example   :MISC:DATE:HOUR 17
    :MISC:DATE:HOUR?
    -> :MISC:DATE:HOUR 12
Description This setting takes effect when :MISC:DATE:SET is executed.

:MISC:DATE:MINute
Function   Sets or queries the minute.
Syntax   :MISC:DATE:MINute {<NRf>}
    <NRf> = 0 to 59 (in steps of 1)
    :MISC:DATE:MINute?
Example   :MISC:DATE:MINUTE 5
    :MISC:DATE:MINUTE?
    -> :MISC:DATE:MINUTE 59
Description This setting takes effect when :MISC:DATE:SET is executed.

:MISC:DATE:MODE
Function   Sets or queries the date display type.
Syntax   :MISC:DATE:MODE {TYPE1|TYPE2|TYPE3}
    :MISC:DATE:MODE?
Example   :MISC:DATE:MODE TYPE1
    :MISC:DATE:MODE?
    -> :MISC:DATE:MODE TYPE2
Description Date display types
    2009/08/29 12:16   TYPE1
    08/29/2006 12:16   TYPE2
    2009/AUG/29 12:16 TYPE3

:MISC:DATE:MONTh
Function   Sets or queries the month.
Syntax   :MISC:DATE:MONTh {<NRf>}
    <NRf> = 1 to 12
    :MISC:DATE:MONTh?
Example   :MISC:DATE:MONTh 8
    :MISC:DATE:MONTH? -> MISC:DATE:MONTH 8
Description This setting takes effect when :MISC:DATE:SET is executed.

:MISC:DATE:SECond

Function	Sets or queries the second.
Syntax	`:MISC:DATE:SECond {<NRf>}`
	`<NRf>` = 0 to 59 (in steps of 1)
Example	`:MISC:DATE:SECOND 0`
	`:MISC:DATE:SECOND?`
	`-> :MISC:DATE:SECOND 0`
Description	This setting takes effect when :MISC:DATE:SET is executed.

:MISC:DATE:SET

Function	Applies the date and time change.
Syntax	`:MISC:DATE:SET`
Example	`:MISC:DATE:SET`

:MISC:DATE:YEAR

Function	Sets or queries the year.
Syntax	`:MISC:DATE:YEAR {<NRf>}`
	`<NRf>` = 2009 to 2035 (in steps of 1)
	`:MISC:DATE:YEAR?`
Example	`:MISC:DATE:YEAR 2009`
	`:MISC:DATE:YEAR? -> :MISC:DATE:YEAR 2009`
Description	This setting takes effect when :MISC:DATE:SET is executed.

:MISC:LANGuage

Function	Sets or queries the language.
Syntax	`:MISC:LANGuage {JAPANESE|ENGLISH}`
	`:MISC:LANGuage?`
Example	`:MISC:LANGUAGE ENGLISH`
	`:MISC:LANGUAGE? -> :MISC:LANGUAGE ENGLISH`

:MISC:POWersave:AC

Function	Sets or queries the power-save setting when the AC adapter is connected.
Syntax	`:MISC:POWersave:AC {OFF|A1MIN|A5MIN|A10MIN|A30MIN}`
	`:MISC:POWersave:AC?`
Example	`:MISC:POWERSAVE:AC A1MIN`
	`:MISC:POWERSAVE:AC? -> :MISC:POWERSAVE:AC OFF`
Description	Disable: OFF
	Power save after 1 minute: A1MIN
	Power save after 5 minutes: A5MIN
	Power save after 10 minutes: A10MIN
	Power save after 30 minutes: A30MIN

:MISC:POWersave:BATTery

Function	Sets or queries the power-save setting when the AQ1100 is running on battery power.
Syntax	`:MISC:POWersave:BATTery {OFF|A1MIN|A5MIN|A10MIN|A30MIN}`
	`:MISC:POWersave:BATTery?`
Example	`:MISC:POWERSAVE:BATTERY A1MIN`
	`:MISC:POWERSAVE:BATTERY? -> :MISC:POWERSAVE:BATTERY OFF`
Description	The parameters are the same as those for :MISC:POWersave:AC.

4.6 NETWork Group

The commands in this group can only be used on models with the /LAN option.

:NETWork:CONTrol:PASSword

Function	Sets or queries the password.
Syntax	:NETWork:CONTrol:PASSword <character string>
Example	:NETWORK:CONTROLl:PASSWORD "ABC"
	:NETWORK:CONTROLl:PASSWORD?
	-> :NETWORK:CONTROLl:PASSWORD "ABC"
Description	You cannot use this command if NETWork:STATe is set to OFF.
	The setting specified by this command takes effect when the AQ1100 is restarted. You can restart the AQ1100 by using :SYSTem:REBoot.
	You do not have to set the password when the user name is "anonymous."

:NETWork:CONTrol:TIMeout

Function	Sets or queries the timeout value.
Syntax	:NETWork:CONTrol:TIMeout {<NRf>|INFinite}
	:NETWork:CONTrol:TIMeout?
	<NRf>: 1 to 3600
Example	:NETWORK:CONTROL:TIMEOUT 30
	:NETWORK:CONTROL:TIMEOUT?
	-> :NETWORK:CONTROL:TIMEOUT 30
Description	The unit is seconds.
	You cannot use this command if NETWork:STATe is set to OFF.
	The setting specified by this command takes effect when the AQ1100 is restarted. You can restart the AQ1100 by using :SYSTem:REBoot.

:NETWork:CONTrol:USERname

Function	Sets or queries the user name.
Syntax	:NETWork:CONTrol:USERname <character string>
Example	:NETWORK:CONTROL:USERNAME "anonymous"
	:NETWORK:CONTROL:USERNAME?
	-> :NETWORK:CONTROL:USERNAME "anonyumous"
Description	You cannot use this command if NETWork:STATe is set to OFF.
	The setting specified by this command takes effect when the AQ1100 is restarted. You can restart the AQ1100 by using :SYSTem:REBoot.

:NETWork:DHCP

Function	Sets or queries the DHCP on/off state.
Syntax	:NETWork:DHCP <Boolean>
	:NETWork:DHCP?
Example	:NETWORK:DHCP ON
	:NETWORK:DHCP? -> :NETWORK:DHCP 1
Description	Invalid: OFF or 0
	Valid: ON or 1
	You cannot use this command if NETWork:STATe is set to OFF.
	The setting specified by this command takes effect when the AQ1100 is restarted. You can restart the AQ1100 by using :SYSTem:REBoot.

:NETWork:GATeway

Function	Sets or queries the gateway.
Syntax	:NETWork:GATeway <character string>
	:NETWork:GATeway?
Example	:NETWORK:GATEWAY "255.255.255.0"
	:NETWORK:GATEWAY? -> :NETWORK: GATEWAY "255.255.255.0"
Description	You cannot use this command if NETWork:STATe is set to OFF.
	You cannot use this command if NETWork:DHCP is set to OFF.
	The setting specified by this command takes effect when the AQ1100 is restarted. You can restart the AQ1100 by using :SYSTem:REBoot.

:NETWork:IPADdress

Function	Sets or queries the IP address.
Syntax	:NETWork:IPADdress <character string>
	:NETWork:IPADdress?
Example	:NETWORK:IPADDRESS "192.168.0.1"
	:NETWORK:IPADDRESS? -> :NETWORK: IPADDRESS "192.168.0.1"
Description	You cannot use this command if NETWork:STATe is set to OFF.
	You cannot use this command if NETWork:DHCP is set to OFF.
	The setting specified by this command takes effect when the AQ1100 is restarted. You can restart the AQ1100 by using :SYSTem:REBoot.

:NETWork:NETMask

Function	Sets or queries the subnet mask.
Syntax	:NETWork:NETMask <character string>
	:NETWork:NETMask?
Example	:NETWORK:NETMASK "255.255.255.0"
	:NETWORK:NETMASK? -> :NETWORK:
	NETMASK "255.255.255.0"
Description	You cannot use this command if NETWork:STATe is set to OFF.
	You cannot use this command if NETWork:DHCP is set to OFF.
	The setting specified by this command takes effect when the AQ1100 is restarted. You can restart the AQ1100 by using :SYSTem:REBoot.

:NETWork:STATe

Function	Sets or queries the Ethernet on/off state.
Syntax	:NETWork:STATe <Boolean>
	:NETWork:STATe?
Example	:NETWORK:STATE ON
	:NETWORK:STATE? -> :NETWORK:STATE 1
Description	Invalid: OFF or 0
	Valid: ON or 1
	The setting specified by this command takes effect when the AQ1100 is restarted. You can restart the AQ1100 by using :SYSTem:REBoot.

4.7　PMETer Group

The commands in this group deal with the power meter. You can make the same settings and queries that you can by using the front panel.

:PMETer:AVERage:TIMes
Function	Sets or queries the power meter average count.
Syntax	:PMETer:AVERage:TIMes <T1|T10|T50|T100>
	:PMETer:AVERage:TIMes?
Example	:PMETER:AVERAGE:TIMES T1
	:PMETER:AVERAGE:TIMES? -> :PMETER:
	AVERAGE:TIMES T1
Description	T1:　　1
	T10:　10
	T50:　50
	T100: 100

:PMETer:DREF
Function	Executes Dref on the power meter.
Syntax	:PMETer:DREF
Example	:PMETer:DREF

:PMETer:LINK:STATe
Function	Sets or queries the light source power meter setting interlock.
Syntax	:PMETer:LINK:STATe {<Boolean>}
Example	:PMETER:LINK:STATE ON
	:PMETER:LINK:STATE?
	-> :PMETER:LINK:STATE 1

:PMETer:MAXMin:STATe
Function	Sets or queries the MAX and MIN display on/off state.
Syntax	:PMETer:MAXMin:STATe {<Boolean>}
Example	:PMETER:MAXMIN:STATE ON
	:PMETER:MAXMIN:STATE?
	-> :PMETER:MAXMIN:STATE 1

:PMETer:MAXMin:MAX?
Function	Sets or queries the maximum value.
Syntax	:PMETer:MAXMin:MAX?
Example	:PMETER:MAXMIN:MAX? -> :PMETER:MAXMIN:
	MAX? 5.00
Description	You can only make this query when :PMETer: MAXMin:STATe is set to ON.

:PMETer:MAXMin:MIN?
Function	Sets or queries the minimum value.
Syntax	:PMETer:MAXMin:MIN?
Example	:PMETER:MAXMIN:MIN? -> :PMETER:MAXMIN:
	MIN? -5.00
Description	You can only make this query when :PMETer: MAXMin:STATe is set to ON.

:PMETer:MEASurement:DATA?
Function	Queries the power meter's measured results.
Syntax	:PMETer:MEASurement:DATA?
Example	:PMETER:MEASUREMENT:DATA?
	-> :PMETER:MEASUREMENT:DATA 26.56

:PMETer:MODulation
Function	Sets or queries the power meter modulation.
Syntax	:PMETer:MODulation {MOD_270HZ|MOD_CW
	|MOD_1KHZ|MOD_2KHZ}
Example	:PMETER:MODULATION MOD_270HZ
	:PMETER:MODULATION?
	-> :PMETER:MODULATION MOD_270HZ
Description	You cannot use this command on products whose power meter suffix code is "PPM".

:PMETer:OFFSet
Function	Sets or queries the power meter offset.
Syntax	:PMETer:OFFSet {<NRf>}
	:PMETer:OFFSet?
	<NRf> = -9.900 to 9.900 (in steps of 0.001)
Example	:PMETER:OFFSET -5.000
	:PMETER:OFFSET?
	-> :PMETER:OFFSET -3.000

:PMETer:REFerence
Function	Sets or queries the power meter reference value.
Syntax	:PMETer:REFerence {<NRf>}
	:PMETer:REFerence?
	<NRf> = -70.00 to 5.00 (in steps of 0.001) [dBm]
Example	:PMETER:REFERENCE 0.00
	:PMETER:REFERENCE?
	-> :PMETER:REFERENCE 0.00

:PMETer:THReshold:LOWer
Function	Sets or queries the power meter lower threshold value.
Syntax	:PMETer:THReshold:LOWer {<NRf>}
	<NRf> = -70.00 to 5.00 (in steps of 0.001) [dBm]
Example	:PMETER:THRESHOLD:LOWER -70.00
	:PMETER:THRESHOLD:LOWER?
	-> :PMETER:THRESHOLD:LOWER -70.00

:PMETer:THReshold:UPPer

Function   Sets or queries the power meter upper threshold
            value.
Syntax   :PMETer:THReshold:UPPer {<NRf>}
            <NRf> = -70.00 to 5.00 (in steps of 0.001) [dBm]
Example   :PMETER:THRESHOLD:UPPER -70
            :PMETER:THRESHOLD:UPPER?
            -> :PMETER:THRESHOLD:UPPER -70

:PMETer:UNIT

Function   Sets or queries the power meter display unit.
Syntax   :PMETer:UNIT {DB|DBM|W}
            :PMETer:UNIT ?
Example   :PMETER:UNIT DBM
            :PMETER:UNIT ? -> :PMETER:UNIT DB

:PMETer:WAVelength:DETail

Function   Sets or queries the wavelength when the wavelength
            mode is set to Detail.
Syntax   :PMETer:WAVelength:DETail {<NRf>}
            :PMETer:WAVelength:DETail?
            <NRf> = 0.850um to 1.650um
                    (850E-9 to 1650E-9)
Example   :PMETer:WAVELENGTH:DETAIL 0.85um
            :PMETer:WAVELENGTH:DETAIL 1650E-9
            :PMETer:WAVELENGTH:DETAIL 1.650E-6
            :PMETer:WAVELENGTH:DETAIL?
            -> PMETER:WAVELENGTH:DETAIL 1550E-09
Description If the wavelength mode is set to Simple or CWDM,
            executing this command sets the mode to Detail.

:PMETer:ZERoset

Function   Executes zero set on the power meter.
Syntax   :PMETer:ZERoset
Example   :PMETER:ZEROSET

4.8   PON Group

The commands in this group deal with the power meter. These commands are valid when the PON option is selected. You can make the same settings and queries that you can by using the front panel.

`:PON:AVERage:TIMes`
Function   Sets or queries the PON power meter average count.
Syntax   `:PON:AVERage:TIMes <T1|T10|T50|T100>`
          `:PON:AVERage:TIMes?`
Example   `:PON:AVERAGE:TIMES`
          `:PON:AVERAGE:TIMES? -> :PON:AVERAGE:`
          `TIMES T1`

`:PON:DIRection`
Function   Sets or queries the PON power meter wavelength.
Syntax   `:PON:DIRection {ONT2OLT|OLT2ONU}`
Example   `:PON:DIRECTION ONT2OLT`
          `:PON:DIRECTION?`
          `-> :PON:DIRECTION ONT2OLT`

`:PON:M1310:MEASurement:DATA?`
Function   Queries the measured results of the 1310 nm PON power meter.
Syntax   `:PON:M1310:MEASurement:DATA?`
Example   `:PON:M1310:MEASUREMENT:DATA?`
          `-> :PON:M1310:MEASUREMENT:DATA`

`:PON:M1310:OFFSet`
Function   Sets or queries the 1310 nm PON power meter offset.
Syntax   `:PON:M1310:OFFSet {<NRf>}`
          `<NRf> = -9.900 to 9.900 (in steps of 0.001)`
Example   `:PON:M1310:OFFSET -9.900`
          `:PON:M1310:OFFSET?`
          `-> :PON:M1310:OFFSET -9.900`

`:PON:M1310:THReshold:JUDGe?`
Function   Queries the threshold judgment results of the 1310 nm PON power meter.
Syntax   `:PON:M1310:THReshold:JUDGe?`
Example   `:PON:M1310:THRESHOLD:JUDGE?`
          `-> :PON:M1310:THRESHOLD:JUDGE FAIL`
Description   A result of PASS or FAIL is returned.

`:PON:M1310:THReshold:LOWer`
Function   Sets or queries the lower threshold value of the 1310 nm PON power meter.
Syntax   `:PON:M1310:THReshold:LOWer {<NRf>}`
          `<NRf> = -70.00 to 5.00` (in steps of 0.001) `[dBm]`
Example   `:PON:M1310:THRESHOLD:LOWER -70.00`
          `:PON:M1310:THRESHOLD:LOWER?`
          `-> :PON:M1310:THRESHOLD:LOWER -70.00`

`:PON:M1310:THReshold:UPPer`
Function   Sets or queries the upper threshold value of the 1310 nm PON power meter.
Syntax   `:PON:M1310:THReshold:UPPer {<NRf>}`
          `<NRf> = -70.00 to 5.00` (in steps of 0.001) `[dBm]`
Example   `:PON:M1310:THRESHOLD:UPPER -70.00`
          `:PON:M1310:THRESHOLD:UPPER?`
          `-> :PON:M1310:THRESHOLD:UPPER -70.00`

`:PON:M1490:MEASurement:DATA?`
Function   Queries the measured results of the 1490 nm PON power meter.
Syntax   `:PON:MEASurement:DATA?`
Example   `:PON:MEASUREMENT:DATA?`
          `-> :PON:MEASUREMENT:DATA -26.5`

`:PON:M1490:OFFSet`
Function   Sets or queries the 1490 nm PON power meter offset.
Syntax   `:PON:M1490:OFFSet {<NRf>}`
          `<NRf> = -9.900 to 9.900 (in steps of 0.001)`
Example   `:PON:M1490:OFFSET -9.900`
          `:PON:M1490:OFFSET?`
          `-> :PON:M1490:OFFSET -9.900`

`:PON:M1490:THReshold:JUDGe?`
Function   Queries the threshold judgment results of the 1490 nm PON power meter.
Syntax   `:PON:M1490:THReshold:JUDGe?`
Example   `:PON:M1490:THRESHOLD:JUDGE?`
          `-> :PON:M1490:THRESHOLD:JUDGE FAIL`
Description   A result of PASS or FAIL is returned.

`:PON:M1490:THReshold:LOWer`
Function   Sets or queries the lower threshold value of the 1490 nm PON power meter.
Syntax   `:PON:M1490:THReshold:LOWer {<NRf>}`
          `<NRf> = -70.00 to 5.00` (in steps of 0.001) `[dBm]`
Example   `:PON:M1490:THRESHOLD:LOWER -70.00`
          `:PON:M1490:THRESHOLD:LOWER?`
          `-> :PON:M1490:THRESHOLD:LOWER -70.00`

:PON:M1490:THReshold:UPPer

Function	Sets or queries the upper threshold value of the 1490 nm PON power meter.
Syntax	:PON:M1490:THReshold:UPPer {<NRf>}
	<NRf> = −70.00 to 5.00 (in steps of 0.001) [dBm]
Example	:PON:M1490:THRESHOLD:UPPER −70.00
	:PON:M1490:THRESHOLD:UPPER?
	-> :PON:M1490:THRESHOLD:UPPER −70.00

:PON:M1550:MEASurement:DATA?

Function	Queries the measured results of the 1550 nm PON power meter.
Syntax	:PON:M1550:MEASurement:DATA?
Example	:PON:M1550:MEASUREMENT:DATA?
	-> :PON:M1550:MEASUREMENT:DATA

:PON:M1550:OFFSet

Function	Sets or queries the 1550 nm PON power meter offset.
Syntax	:PON:M1550:OFFSet {<NRf>}
	<NRf> = −9.900 to 9.900 (in steps of 0.001)
Example	:PON:M1550:OFFSET −9.900
	:PON:M1550:OFFSET?
	-> :PON:M1550:OFFSET −9.900

:PON:M1550:THReshold:JUDGe?

Function	Queries the threshold judgment results of the 1550 nm PON power meter.
Syntax	:PON:M1550:THReshold:JUDGe?
Example	:PON:M1550:THRESHOLD:JUDGE?
	-> :PON:M1550:THRESHOLD:JUDGE FAIL
Description	A result of PASS or FAIL is returned.

:PON:M1550:THReshold:LOWer

Function	Sets or queries the lower threshold value of the 1550 nm PON power meter.
Syntax	:PON:M1550:THReshold:LOWer {<NRf>}
	<NRf> = −70.00 to 5.00 (in steps of 0.001) [dBm]
Example	:PON:M1550:THRESHOLD:LOWER −70.00
	:PON:M1550:THRESHOLD:LOWER?
	-> :PON:M1550:THRESHOLD:LOWER −70.00

:PON:M1550:THReshold:UPPer

Function	Sets or queries the upper threshold value of the 1550 nm PON power meter.
Syntax	:PON:M1550:THReshold:UPPer {<NRf>}
	<NRf> = −70.00 to 5.00 (in steps of 0.001) [dBm]
Example	:PON:M1550:THRESHOLD:UPPER −70.00
	:PON:M1550:THRESHOLD:UPPER?
	-> :PON:M1550:THRESHOLD:UPPER −70.00

:PON:UNIT

Function	Sets or queries the PON power meter display unit.
Syntax	:PON:UNIT {DBM|W}
Example	:PON:UNIT DBM
	:PON:UNIT ? -> :PON:UNIT DBM

:PON:ZERoset

Function	Executes zero set on the PON power meter.
Syntax	:PON:ZERoset
Example	:PON:ZEROSET

4.9   PRINt Group

The commands in this group deal with printing. You can make the same settings and queries that you can by using the front panel.

:PRINt:COLor
Function   Sets or queries the print colors.
Syntax   :PRINt:COLor {COLOR | BW}
            :PRINt:COLor?
Example   :PRINT:COLOR COLOR
            :PRINT:COLOR? -> :PRINT:COLOR BW
Description Screen colors: COLOR
            Black and white: BW

:PRINt:EXECute
Function   Executes printing.
Syntax   :PRINt:EXECute
Example   :PRINT:EXECUTE

:PRINt:MAKer
Function   Sets or queries the printer manufacturer.
Syntax   :PRINt:MAKer {HP|EPSON|SEIKO}
            :PRINt:MAKer?
Example   :PRINT:MAKER HP
            :PRINT:MAKER?
            -> :PRINT:MAKER EPSON
Description HP inkjet printer: HP
            EPSON inkjet printer: EPSON
            Seiko Instruments MPU-L465:   SEIKO

4.10 SETup Group

The commands in this group deal with the initialization of the settings. The AQ1100 settings can be returned to their factory defaults.

:SETup:INITialize

Function   Returns all settings to their factory defaults.

Syntax   :SETup:INITialize

Example   :SETUP:INITIALIZE

4.11 STATus Group

The commands in this group are used to make settings and queries related to the communication status feature. There are no front panel keys that correspond to the commands in this group.

:STATus?

Function Queries all the settings for the communication status feature.

Syntax :STATus?

Example :STATUS? -> :STATUS:QENABLE1; QMESSAGE 1

:STATus:CONDition?

Function Queries the contents of the condition register.

Syntax :STATus:CONDition?

Example :STATUS:CONDITION? -> 16

Description For information about the condition register, see section 5.1, "Condition Register."

:STATus:ERRor?

Function Queries the error code and message information (top of the error queue).

Syntax :STATus:ERRor?

Example :STATUS:ERROR? ->113,"Undefined header"

:STATus:QENable

Function Sets or queries whether or not messages other than errors will be stored to the error queue (on/off).

Syntax :STATus:QENable {<Boolean>}:STATus: QENable?

Example :STATUS:QENABLE ON

:STATUS:QENABLE? -> :STATUS:QENABLE 1

:STATus:QMESsage

Function Sets or queries whether or not message information will be attached to the response to the STATus: ERRor? query (on/off).

Syntax :STATus:QMESsage {<Boolean>}

:STATus:QMESsage?

Example :STATUS:QMESSAGE OFF

:STATUS:QMESSAGE? -> :STATUS:QMESSAGE 1

4.12 SYSTem Group

The commands in this group deal with startup. There are no front panel keys that correspond to the commands in this group.

:SYSTem:REBoot

Function   Restarts the AQ1100.

Syntax   :SYSTem:REBoot

Example   :SYSTEM:REBOOT

:SYSTem:SHUTdown

Function   Shuts down the AQ1100.

Syntax   :SYSTem:SHUTdown

Example   :SYSTEM:SHUTDOWN

4.13 VLS Group

The commands in this group deal with the visible light source. These commands are valid when the VLS option is selected. You can perform the same operations and make the same settings and queries that you can by using the front panel.

:VLS:ABORt

Function	Turns the visible light source off.
Syntax	:VLS:ABORt
Example	:VLS:ABORT

:VLS:EXECute

Function	Turns the visible light source on.
Syntax	:VLS:EXECute
Example	:VLS:EXECUTE

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Commands

4.14 Common Commands

*CLS (Clear Status)
Function   Clears all event status registers that are displayed in the status byte register summary.

Syntax   *CLS

Example   *CLS

Description • Clears all queues except the output queue and all event registers except the MAV summary message.
            • After this command is executed, the AQ1100 is set to OCIS (Operation Complete Command Idle State) and OQIS (Operation Complete Query Idle State).

*ESE (Standard Event Status Enable)
Function   Sets or queries the standard event enable register.

Syntax   *ESE<wsp><integer>
            *ESE?
            <integer> = 0 to 255

Example   *ESE 251
            *ESE? -> 251

Description • Each item whose bit is set is enabled.
            • The ESE is set to its default value when:
              The power is turned on.
              Zero is set.
            • The ESE does not change its value when the following commands are executed:
              *RST
              *CLS
              Device clear (DCL, SDC)
            • The default value is zero.

*ESR? (Standard Event Status Register)
Function   Queries and clears the standard event status register.

Syntax   *ESR?

Example   *ESR? -> 251

Description The returned value of this query is not affected by the ESE (Event Status Enable Register).

*IDN? (Identification)
Function   Queries the instrument type and firmware version.

Syntax   *IDN?

Example   *IDN? -> YOKOGAWA,AQ1100,SN123456789, F1.00

Description Four data fields delimited by commas are returned.
            Field 1: Manufacturer   "YOKOGAWA"
            Field 2: Model   "AQ1100"
            Field 3: Instrument serial number
                                       "SN123456789"
            Field 4: Firmware version "F1.00"

*OPT? (Option)
Function   Queries the option information.

Syntax   *OPT?

Example   *OPT? -> PM,LS,LAN

Description The installed options are returned delimited by commas.
            Power meter: PM
            Light source: LS
            Visible light source: VLS
            LAN: LAN

*RST (Reset)
Function   Returns all the settings except the communication settings to their factory default values.

Syntax   *RST

Example   *RST

Description • This command stops the operation in progress and resets the AQ1100 to its factory defaults.
            • The following items do not change:
              Output queue
              SRE
              ESE
              Calibration data that affects the AQ1100 specifications

*SRE (Service Request Enable)

Function   Sets or queries the service request enable register.

Syntax   `*SRE <wsp><integer>`

            `*SRE?`

            `<integer> = 0 to 255`

Example   `*SRE  250`

            `*SRE? -> 250`

Description • Each item whose bit is set is enabled.

            • The SRE is set to its default value when:

              The power is turned on.

              Zero is set.

            • The SRE does not change its value when the
              following commands are executed:

              *RST

              *CLS

              Device clear (DCL, SDC)

            • The default value is zero.

*STB? (Read Status Byte)

Function   Queries the current status byte register value.

Syntax   `*STB?`

Example   `*STB? -> 251`

Description The STB is not cleared even if it is read.

*TST? (Self Test)

Function   Executes a self-test.

Syntax   `*TST?`

Example   `*TST? -> 0`

Description The AQ1100 returns 0 if the self-test is successful
            and 1 if it is not.

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Commands

5.1   Condition Register

The condition register indicates the internal condition of the instrument.

Condition Register
:STATus:CONDition?

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	0	0	0	LS	PME	PMZ	PMM	0	AR	0	FIA	0	FILE	0	0

The meaning of each bit of the condition register is as follows:

Bit 2	FILE	Set to 1 while a file is being accessed.
Bit 4	FIA	Set to 1 while checking whether the fiber is in use.
Bit 6	AR	Set to 1 while the auto range measurement is in progress.
Bit 8	PMM	Set to 1 while the power meter measurement is in progress.
Bit 9	PMZ	Set to 1 while the power meter is being reset to zero.
Bit 10	PME	Set to 1 while a measurement error is occurring in the power meter.
Bit 11	LS	Set to 1 while the light source is ON.

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Condition Register / Output and Error Queue

5.2 Output and Error Queue

Output Queue

The output queue stores query response messages. As shown below, data is stored in order and read from the oldest message first. The output queue is cleared when the AQ1100 is turned off and then back on.

The output queue cannot be emptied using the *CLS command. To see whether the output queue is emptyor not, check bit 4 (MAV) of the status byte.
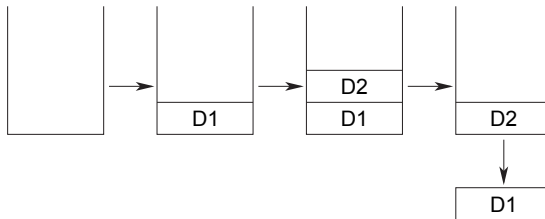
Error Queue

When an error occurs, the error queue stores the error number and message. For example, if the AQ1100 receives an incorrect program message from the controller, the error number (113) and the error message ("Undefined header") are stored in the error queue when the DLM2000 displays the error message.
You can use the :STATus:ERRor? query to read the contents of the error queue. Like the output queue, the messages in the error queue are read from the oldest one first.
If the error queue overflows, the last message is replaced with the following message: 350, "Queue overflow"
The error queue is cleared when:
*   A *CLS command is received.
*   The DLM2000 is turned off and then back on.

You can determine whether or not the error queue is empty by checking bit 2 in the status byte (EAV).

Appendix   Error Messages

This section explains communication error messages.

- Messages can be displayed in English or in another language on the AQ1100. However, when they are read from a PC or other similar device, messages are displayed in English.
- If servicing is necessary to solve the problem indicated by a message, contact your nearest YOKOGAWA dealer.
- Only communication error messages are listed here. For other error messages, see the *User's Manual IM AQ1100-01EN*.

Error in Execution

Code	Message
50	*OPC/? exists in message.
102	Syntax error.
103	Invalid separator.
104	Data type error.
108	Parameter not allowed.
109	Missing parameter.
111	Header separator error.
112	Program mnemonic too long.
113	Undefined header.
114	Header suffix out of range.
120	Numeric data error.
123	Exponent too large.
124	Too many digits.
128	Numeric data not allowed.
131	Invalid suffix.
134	Suffix too long.
138	Suffix not allowed.
141	Invalid character data.
144	Character data too long.
148	Character data not allowed.
150	String data error.
151	Invalid string data.
158	String data not allowed.
161	Invalid block data.
168	Block data not allowed.
171	Invalid expression.
178	Expression data not allowed.
181	Invalid outside macro definition.
221	Setting conflict.
222	Data out of range.
223	Data invalid
224	Illegal parameter value.
241	Hardware missing.
260	Expression error.
270	Macro error.
272	Macro execution error.
273	Improper macro label.
275	Macro definition too long.
276	Macro recursion error.
277	Macro redefinition not allowed
278	Macro header not found.
350	Queue overflow.
410	Query INTERRUPTED.
420	Query UNTERMINATED.
430	Query DEADLOCKED.
440	Query UNTERMINATED after indefinite response.

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